

# Claims

- [c1] 1.A machining apparatus comprising:  
a discharge machining head assembly; and  
an electromagnet configured to support the head assembly in a position to machine an area.
- [c2] 2.The apparatus of claim 1, wherein the head assembly has dimensions no larger than about 6.5 inches by about 9.6 inches by about 5.5 inches.
- [c3] 3.The apparatus of claim 1, wherein the head assembly has dimensions no larger than about 3.3 inches by about 4.8 inches by about 2.8 inches.
- [c4] 4.The apparatus of claim 1, configured to have five axes of adjustment.
- [c5] 5.The apparatus of claim 1, further comprising three manual slides configured to provide three axes of adjustment for the discharge machining head assembly.
- [c6] 6.The apparatus of claim 1, further comprising a tilt and swivel vice configured to provide 2 axes of adjustment for the discharge machining head assembly.

- [c7] 7.The apparatus of claim 1, wherein the discharge machining head assembly is an electro-discharge machining head assembly.
- [c8] 8.The apparatus of claim 1, wherein the discharge machining head assembly is an electrochemical discharge machining head assembly.
- [c9] 9.The apparatus of claim 1 wherein the discharge machining head assembly is configured to drill a hole of up to about 12 mm in diameter.
- [c10] 10.An apparatus for machining comprising:  
a discharge machining head assembly; and  
a head assembly adaptor plate coupled to the discharge machining head assembly.
- [c11] 11.The apparatus of claim 10, wherein the adaptor plate is configured to also couple to a multi-axis robot arm.
- [c12] 12.The apparatus of claim 10, wherein the apparatus has dimensions no larger than about 6.5 inches by about 9.6 inches by about 5.5 inches.
- [c13] 13.The apparatus of claim 10, wherein the apparatus has dimensions no larger than about 3.3 inches by about 4.8 inches by about 2.8 inches.
- [c14] 14.The apparatus of claim 10, wherein the discharge

machining head assembly is an electro-discharge machining head assembly.

[c15] 15.The apparatus of claim 10, wherein the discharge machining head assembly is an electrochemical discharge machining head assembly.

[c16] 16.The apparatus of claim 10 wherein the discharge machining head assembly is configured to drill a hole of about 12 mm in diameter.

[c17] 17.An apparatus for machining comprising:  
a discharge machining head assembly;  
a sliding assembly coupled to the discharge machining head assembly; and  
a sliding assembly adaptor plate coupled to the sliding assembly.

[c18] 18.The apparatus of claim 17, wherein the adaptor plate is configured to couple to a multi-axis robot arm.

[c19] 19.The apparatus of claim 17, wherein the head assembly has dimensions no larger than about 6.5 inches by about 9.6 inches by about 5.5 inches.

[c20] 20.The apparatus of claim 15, wherein the head assembly has dimensions no larger than about 3.3 inches by about 4.8 inches by 2.8 about inches.

- [c21] 21.The apparatus of claim 17 configured to have 5 axes of adjustment.
- [c22] 22.The apparatus of claim 17, wherein the sliding assembly comprises three manual slides which are configured to provide 3 axes of adjustment to the discharge machining head assembly.
- [c23] 23.The apparatus of claim 17, wherein the slide assembly comprises a tilt and swivel vice which is configured to provide 2 axes of adjustment to the discharge machining head assembly.
- [c24] 24.The apparatus of claim 17, wherein the discharge machining head assembly is an electro-discharge machining head assembly.
- [c25] 25.The apparatus of claim 17, wherein the discharge machining head assembly is an electrochemical discharge machining head assembly.
- [c26] 26.The apparatus of claim 17 wherein the discharge machining head assembly is configured to drill a hole of about 12 mm in diameter.
- [c27] 27.An apparatus for guiding a drill electrode comprising:  
a bushing;  
an insulated annulus located in the bushing; and

a bushing holder coupled to the bushing.

- [c28] 28.The apparatus of claim 27, wherein the bushing holder is a magnetic base.
- [c29] 29.A method for machining comprising:  
attaching a machining tool to a surface;  
positioning a drill electrode to a work piece; and  
drilling the work piece with the machining tool.
- [c30] 30.The method of claim 29 wherein the attaching act comprises:  
magnetically attaching a machining tool to a surface.
- [c31] 31.The method of claim 29 wherein the positioning act comprises:  
adjusting a 5 axis slide assembly to position the drill electrode.
- [c32] 32.The method of claim 29, wherein the drilling act comprises:  
drilling the work piece with the machining tool using  
electro-discharge machining.
- [c33] 33.The method of claim 29, wherein the drilling act comprises:  
drilling the work piece with the machining tool using  
electrochemical discharge machining.

[c34] 34. The method of claim 29, wherein the drilling act comprises:  
drilling out a stator blade pin with the machining tool.